

The opinion in support of the decision being  
entered today is not binding precedent of the Board.

Paper 29

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Filed: September 14, 2001

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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BERTRAND MOREL  
Junior party,  
U.S. Patent 5,420,084

v.

JAINAGESH A. SEKHAR  
and VITTORIO DE NORA  
Senior party,  
Application 08/640,115

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Patent Interference 103,995

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Before: McKELVEY, Senior Administrative Patent Judge, and  
SPIEGEL and MEDLEY, Administrative Patent Judges.

SPIEGEL, Administrative Patent Judge.

**MEMORANDUM OPINION and FINAL JUDGMENT**  
**(Decision on preliminary and miscellaneous motions)**

**I. Introduction**

**A. Transfer to the Trial Section**

The interference has been referred to the Trial Section of the Interference Division of the Board of Patent Appeals and Interferences for further handling. See Notice of the Chief Administrative Patent Judge, "Interference Practice -- New Procedures for Handling Interference Cases at the Board of Patent Appeals and Interferences," 1217 Off. Gaz. Pat. & Tm. Office 18 (Dec. 1, 1998).

The board regrets the delay in reaching a decision in this case. As a result of the transfer of the interference to the Trial Section, the parties can expect the interference to proceed in an expeditious manner.

Administrative Patent Judge Carol A. Spiegel has been designated to handle the interference. 37 CFR § 1.610(a).

#### **B. Decision on preliminary motions**

This is a decision on preliminary motions filed by parties Morel and Sekhar in Interference 103,995.

#### **II. Findings of fact**

The following findings of fact are supported by a preponderance of the evidence.

##### Junior party

1. The junior party is Bertrand Morel (**Morel**).
2. Morel is involved in the interference on the basis of U.S. Patent 5,420,084 (the '084 patent), granted May 30, 1995, based on application 08/181,037 (the '037 application), filed January 14, 1994.
3. The real party in interest is CARBONE SAVOIE.

Senior party

4. The senior party is Jainagesh A. Sekhar and Vittorio De Nora (**Sekhar**).
5. Sekhar is involved in the interference on the basis of application 08/640,115 (the '115 application), filed April 30, 1996.
6. Sekhar application 08/640,115 has been accorded benefit for the purpose of priority of  
U.S. application 08/320,960, filed October 12, 1994, and  
U.S. Patent 5,364,513, granted November 15, 1994, based on  
application 07/898,052, filed June 12, 1992 (see Paper 1, Appendix p. 2).

The interference

7. The subject matter of the interference is defined by two counts.
8. Count 1 (Paper 1, Appendix p. 3) reads:

Count 1

A coating composition comprising zirconium dibromide and colloidal silica.

9. Count 2 (Paper 1, Appendix p. 3) reads:

Count 2

The method of claim 79 of application 08/640,115

or

the method of claim 6 of U.S. Patent No. 5,420,084

or

the method of claim 9 of U.S. Patent No. 5,420,084.

10. Method claim 79 of the '115 application reads:

A method of protecting a carbonaceous or graphitic material against atmospheric reactions at high temperatures, comprising depositing a coating comprising zirconium diboride and colloidal silica onto the material to be protected.

11. Method claim 6 of the '084 patent reads:

A method of protecting a material against atmospheric reactions at high temperatures, comprising directly depositing a coating comprising zirconium diboride and colloidal silica onto the material to be protected.

12. Method claim 9 of the '084 patent reads:

A method of protecting a material against atmospheric reaction at high temperatures, comprising depositing a first layer for facilitating adhesion onto said material and depositing onto said first layer a coating comprising zirconium diboride and colloidal silica.

13. The claims of the parties are:

Morel            1-12

Sekhar           77-82

14. The claims of the parties which correspond to Count 1, and therefore are involved in the interference, are:

Morel            1-5

Sekhar        77 and 78

(Paper 1, Appendix p. 4).

15. The claims of the parties which correspond to Count 2, and therefore are involved in the interference, are:

Morel        6 and 9

Sekhar       79-82

(Paper 1, Appendix p. 4).

16. The claims of the parties which do not correspond to either Count 1 or Count 2 are:

Morel        7, 8 and 10-12

Sekhar       none.

Other findings of fact follow below.

### **III. Morel preliminary motion under 37 CFR § 1.633(f)**

17. The '084 patent claims priority of French Application No. 93 01258 under 35 U.S.C. § 119 (the '037 application file Declaration).

18. A certified copy of French Application No. 93 01258 was filed in the '037 application (the '037 application file, Paper 5).

19. A certified copy of French Application No. 93 01258 (Morel Documentary Ex 3) and verified translation thereof (Morel Affidavit Ex 2) have been served on Sekhar.<sup>1</sup>

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<sup>1</sup> Hereinafter, Morel Documentary and Affidavit Exhibits will be referred to as "MDEx" and "MAEx," respectively. Sekhar Documentary Exhibits will be referred to as "SDEx."

Morel moves pursuant to 37 CFR § 1.633(f) for benefit for the purpose of priority of the January 28, 1993 filing date of French Application No. 93 01258 (Paper 13).

Morel preliminary motion under 37 CFR § 1.633(f), when considered in light of the evidence relied upon in support of the motion, establishes a sufficient basis for granting Morel benefit of the January 28, 1993 filing date of French Application No. 93 01258 for the purpose of priority. Further, Sekhar does not oppose Morel preliminary motion under 37 CFR § 1.633(f).

Therefore, Morel preliminary motion under 37 CFR § 1.633(f) is **granted**.

#### **IV. Morel preliminary motion under 37 CFR § 1.633(c)(4)**

Morel moves to redefine the interfering subject matter pursuant to 37 CFR § 1.633(c)(4) by designating Morel claims 2 and 5 as not corresponding to Count 1 (Paper 12). Sekhar opposes (Paper 22). Morel does not reply.

Rule 637(c)(4)(ii) requires that a motion seeking to designate a claim as not corresponding to a count shall

Show that the claim does not define the same patentable invention as any other claim whose designation in the notice declaring the interference as corresponding to the count the party does not dispute.

Rule 601(n) states

Invention "A" is the *same patentable invention* as an invention "B" when invention "A" is the same as (35 U.S.C. § 102) or is obvious (35 U.S.C. § 103) in view of invention "B" assuming invention "B" is prior art with respect to invention "A".

20. The invention of Morel claim 1 is a coating composition containing zirconium diboride and colloidal silica in any amounts.

21. Coating composition claim 2 of the '084 patent reads:

A coating composition according to claim 1, comprising zirconium diboride and colloidal silica in a weight ratio between 1:1 and 9:1.

22. Coating composition claim 5 of the '084 patent reads:

A coating composition [sic, according] to claim 2, additionally comprising silicon carbide.

In support of its preliminary motion, Morel purports to establish that the subject matter of Morel narrow claims 2 and 5 would not have been obvious in view of the subject matter of Morel broad claim 1. The subject matter of Morel broad claim 1 can under no circumstances be prior art vis-a-vis Morel. Accordingly, what Morel was required to establish was that the subject matter of Morel narrow claims 2 and 5 is not anticipated by, or rendered obvious over, the subject matter of a Sekhar claim designated as corresponding to the count. After all, the issue in seeking to designate a claim as not corresponding to a count is to establish that if the opponent wins on the issue of priority, the subject matter of the claims sought to be designated as not corresponding to the count would not be unpatentable under 35 U.S.C. § 102(g)/103 over the subject matter of the claims of the winning party. Morel's procedural non-compliance aside, a penetrating analysis of the record will convincingly show that Morel has failed to prove by a preponderance of the evidence that the subject matter of Morel narrow claims 2 and 5 is patentably distinct from the subject matter of Morel broad claim 1.

According to Morel, coating compositions falling within what is said to be the preferred weight ratio ranges of claims 2 and 5 have “unique properties” (Paper 12, p. 3). Morel relies on test results of compositions within the ranges of claims 2 and 5 reported in the ‘084 patent, test results which allegedly were a “material factor” in the Examiner allowing the ‘037 application (Paper 12, p. 3, ¶ 3). Morel argues that “evidence could be presented” to show the patentability of Morel claims 2 and 5 if Morel claim 1 was found to be unpatentable (Paper 12, p. 3, ¶ 6, emphasis added). Finally, Morel directs our attention to paragraph 8 of the Declaration Veronique Lambert [sic, Laurent] where it is stated that vitrification produces materially different coatings if the weight ratio of zirconium diboride to colloidal silica is greater than 1:1 or less than 1:1 (Paper 12, p. 4, ¶ 7).

23. The ‘084 patent describes “[c]olloidal silica...[as] the only substance which limits oxidation of zirconium diboride” thereby providing a coating with a “much better protective power than prior-art coatings” (c. 3, ll. 44-48).

24. The ‘084 patent describes weight ratios of zirconium diboride to colloidal silica of between 1 and 9 as “preferred” (c. 2, ll. 6-11).

25. Example 1 of the ‘084 patent describes a comparison of the protective effect of samples coated with either a 45% zirconium diboride, 25% colloidal silica and 30% silicon carbide (invention) composition or a 45% titanium diboride, 25% colloidal silica and 30% silicon carbide (prior art) composition (c. 4, ll. 29-68). Samples said to have been thermally tested and coated with the prior art composition are described as “damaged” with a “weight loss varying from 30 to 40%” (c. 4, ll. 62-65), while the five



coated with the invention composition are said to be “undamaged” with “a loss of weight ... less than 2%” (c. 4, ll. 65-68).

26. Example 2 of the ‘084 patent describes samples coated with a 90% zirconium diboride and 10% colloidal silica (invention) composition as having “lost [no] more than 2% by weight, and the state of the coating on the test-pieces was excellent in all cases” after thermal testing (c. 5, ll. 1-20).

27. Example 3 of the ‘084 patent describes coating samples having different expansion coefficients in different directions with two layers of a 45% zirconium diboride, 25% colloidal silica and 30% silicon carbide (invention) composition with and without an underlayer of zinc phosphate (c. 5, ll. 21-49). The samples without the zinc phosphate underlayer are described as having “lost 40 to 50% by weight, even though the coating remained in excellent condition” (c. 6, ll. 1-3) because the “coating had simply come unstuck from the substrate” (c. 6, ll. 3-5).

None of the testing described in the ‘084 patent compares invention “A,” i.e., a coating composition containing zirconium diboride and colloidal silica in any amounts, including weight ratios greater than and less than 1:1 to 9:1, with invention “B,” i.e., a coating composition with a weight ratio within the range of claims 2 and 5.

28. The Examiner’s Statement of Reasons for Allowance of the ‘084 patent reads:

The closest prior art (US 5,310,476) suggests a large group of refractory materials including  $ZrB_2$  in combination with a group of colloidal materials including colloidal silica. The most preferred refractory material of the reference is  $TiB_2$ . Applicants comparative data showing that  $ZrB_2$  is superior to  $TiB_2$  is sufficient to overcome any case of prima facie obviousness that may be established in view of the broad teachings of the closest prior art. [The ‘037 application file, Paper 7, p. 2, ¶ 3.]

Here, it appears what the Examiner considered a “material factor” was the performance of a **ZrB<sub>2</sub>**/colloidal silica coating composition vis-a-vis a **TiB<sub>2</sub>**/colloidal silica coating composition. Moreover, Morel has not pointed us to anything in either the ‘037 application file or the Examiner’s Statement of Reasons for Allowance that indicate the Examiner ever considered the criticality of the 1:1 to 9:1 weight ratio range of Morel claims 2 and 5, particularly since the Examiner was willing to allow broader claim 1. In any event, decisions of a primary examiner during ex parte prosecution are not binding on the Board of Patent Appeals and Interferences in inter partes proceedings. Bloch v. Sze, 458 F.2d 137, 173 USPQ 498 (CCPA 1972); Okada v. Hitotsumachi, 16 USPQ2d 1789 (Comm’r. Pat. 1990); Glaxo Wellcome, Inc. v. Cabilly, 56 USPQ2d 1983 (Bd. Pat. App. & Int. 2000). Furthermore, the “same patentable invention” requirement concerns only the relationship between the count and claims sought to be designated as not corresponding; it does not concern general patentability. See Maier v. Hanawa, 26 USPQ2d 1606 (Comm’r Pats. 1992).

29. Dr. Veronique Laurent, testifying on behalf of Morel, declared that she had read and was familiar with both the ‘084 patent and U.S. Patent 5,364,513 which issued to Sekhar (MAEx 1, p. 2, ¶ 3).

30. The ‘084 patent reads “[t]he coating according to the invention vitrifies”<sup>[2]</sup>

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<sup>2</sup> Hackh’s CHEMICAL DICTIONARY, fourth edition, (McGraw-Hill Book Company, New York, published 1969) defines

**vitrify** as “To sinter or melt to a glassy mass” (p. 717) ,

**sintering** as “The coalescence by heat of crystalline or amorphous particles into a solid mass, due to the formation of allotropic crystals” (p. 614) and

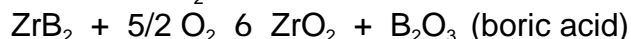
**glass** as “An amorphous, hard, brittle, often transparent material; a fused mixture of the silicates of

between 600 and 700° C” (c. 2, ll. 34-45). The ‘084 patent defines the invention as “a coating for protecting materials against reactions with atmosphere at high temperatures, characterized in that the coating contains zirconium diboride and colloidal silica” (c. 2, ll. 6-9).

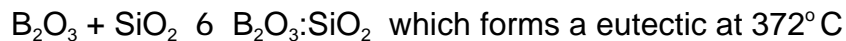
31. Dr. Laurent further testified that

The Morel patent [i.e., the ‘084 patent] discloses the formation of a coating by vitrification of a mixture of zirconium diboride and colloidal silica. By my personal understanding of the process, this vitrification occurs in several steps:

1) Oxidation of  $ZrB_2$



2) Boric oxide reacts with silica



[MAEx 1, p. 2, ¶ 4, emphasis added.]

The glassy material of formula  $B_2O_3:SiO_2$  fills the pores and coats the remaining grains, thereby producing a coating impervious to oxygen. [MAEx 1, p. 2, ¶ 5.]

When added to the mixture, SiC strengthens the coating but does not necessarily take part in the vitrification reaction, since SiC starts to oxidize at 1300 - 1400° C. [MAEx 1, p. 3, ¶ 6.]

32. Dr. Laurent further testified that

When the weight ratio of zirconium diboride to silica is at least about 1:1, vitrification takes place at 600-700° C. With lesser amounts of zirconium diboride, the formation of the glassy eutectic composition is greatly diminished, although, as disclosed in US Patent 5,364,513 the particles may be sintered at temperatures in excess of 900°C. [MAEx 1, p. 3, ¶ 7.]

33. Dr. Laurent still further testified that

I believe that the vitrification which takes place when the weight ratio

of zirconium diboride to colloidal silica is greater than 1:1 results in a materially different coating than a coating formed with lesser amounts of zirconium diboride. [MAEx 1, p. 3, ¶ 8.]

Dr. Laurent does not reveal or explain the underlying basis for her opinions.

Nothing in the Federal Rules of Evidence (applicable to patent interference cases) or Federal Circuit jurisprudence requires a fact finder to credit the unsupported assertions of an expert witness. Rohm and Haas Co. v. Brotech Corp., 127 F.3d 1089, 1092, 44 USPQ2d 1459, 1462 (Fed. Cir. 1997). Since the underlying basis supporting Dr. Laurent's opinions are not set out in her testimony, we decline to accord her opinions any weight.

Here, as argued by Sekhar in its opposition, "[n]o actual tests have been presented by Dr. Laurent or by the party Morel" evincing whether or not a materially different coating is formed by coating compositions having weight ratios of zirconium diboride to colloidal silica of greater than one versus compositions with lesser amounts of zirconium diboride (Paper 22, p. 3). Moreover, it is not inconsistent with Dr. Laurent's testimony (see facts 31 and 32 above) that using a less than stoichiometric amount of zirconium diboride would be expected to produce less borosilicate material, i.e., diminished formation of the glassy material. Producing less of a product (i.e., glassy material) is not the same as producing a materially different product. Furthermore, as further argued by Sekhar, the description in the '084 patent of its coating composition vitrifying at 600 to 700° C (fact 30, p. 10 above) appears to include all weight ratio ranges of zirconium diboride and colloidal silica (Paper 22, p. 4). Whether evidence shows unexpected results is a question of fact. In re Geisler, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). On this record, we find the Laurent

Declaration to be insufficient to establish that coatings having a weight ratio of zirconium diboride to colloidal silica greater than 1:1 provide a materially different coating than a coating formed with lesser amounts of zirconium diboride.

As to “evidence [which] could be presented” to show the patentability of Morel claims 2 and 5, when the moving party is in possession of the necessary evidence, there is no legitimate reason why it should not be presented with the motion. If the motion is not accompanied by the then available evidence of material fact, no further evidence should be received in the interference in connection with the issue raised in the motion. 37 CFR § 1.639. Bayles v. Elbe, 16 USPQ2d 1389, 1392 (Bd. Pat. App. & Int. 1990) (“The rules provide that all evidence in support of a motion must be filed and served with the motion. See 37 CFR § 1.639”); Orikasa v. Oonishi, 10 USPQ2d 1996, 2000 n.12 (Comm’r. Pat. 1989):

[W]here the moving party is in possession of the necessary evidence, there is no legitimate reason why it should not be presented with the motion. If the motion is not accompanied by then available proof of a material fact, no further evidence should be received in the interference in connection with the issue raised in the motion. 37 CFR § 1.639.

Here, as noted by Sekhar in its opposition, “Morel has made no effort to show that the evidence which ‘could be presented’ was not available prior to the filing of this Motion” (Paper 22, p. 2).

Thus, Morel has failed to satisfy the requirements of Rule 637(c)(4)(ii).

Finally, it is not necessary for us to reach Sekhar’s argument that Morel claims 2 and 5 are obvious over Morel claim 1 in view of Weir WO 88/03519 (MDEx 1) (Paper 22,

pp. 4-5).

Therefore, Morel preliminary motion under 37 CFR § 1.633(c)(4) is **denied** for failure to satisfy the requirements of 37 CFR § 1.637(c)(4)(ii).

**V. Sekhar preliminary motion 1**

Sekhar seeks judgment pursuant to 37 CFR § 1.633(a) that

**A.** Morel claims 1, 3-5 and 9 are unpatentable under 35 U.S.C. § 102 as anticipated by Sekhar '513 (SDEx 3),

**B.** Morel claims 1-6 and 9 are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent 5,346,513 (Sekhar '513) (SDEx 3),

**C.** Morel claims 1-6 and 9 are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent 5,310,476 (Sekhar '476) (SDEx 2), and

**D.** Morel claims 1-6 and 9 are unpatentable under 35 U.S.C. § 103 as obvious over Sekhar '513 (SDEx 3) in view of Sekhar '476 (SDEx 2) (Paper 17).

Morel opposes (Paper 20); Sekhar replies (Paper 25).

34. Morel concedes that Morel claims 1, 3, 4, 6 and 9 are unpatentable under 35 U.S.C. § 102 over Sekhar '513 (Paper 20, p. 2).

Thus, only the patentability of Morel claims 2 and 5 remain at issue.

**A. Is Morel claim 5 anticipated by Sekhar '513**

35. Sekhar '513 (SDEx 3) relates to

a protective coating on a body of carbonaceous or other material which improves the resistance of the body to oxidation, and which may also enhance the bodies [sic] electrical conductivity and/or its electrochemical activity [which] is applied from a colloidal slurry containing particulate reactant or non-reactant substances, or a mixture of particulate reactant and

non-reactant substances, which when the body is heated to a sufficient elevated temperature form the protective coating by reaction sintering and/or by sintering without reaction (c. 1, l. 64 - c. 2, l. 6).

36. Sekhar '513 describes two types of coatings, i.e., micropyretric coatings which contain combustible materials and non-micropyretric coatings which do not contain any combustible material (c. 2, ll. 42-50), which can be used alone or in combination (c. 2, ll. 50-51) and are applied as colloidal slurries in one or more layers (c. 2, ll. 51-54; c. 8, ll. 13-16 and 37-41).

37. The slurry comprises

(1) a colloidal carrier, e.g., colloidal alumina, colloidal ceria, colloidal yttria, colloidal silica, colloidal zirconia, monoaluminum phosphate, colloidal cerium acetate or mixtures thereof and

(2) at least one additive selected from

(b) powder additives containing carbides, silicides, borides, nitrides, oxides, nitrides [sic], carbonitrides, oxynitrides, boric acid and its salts, and combinations thereof,

(c) metallic particles such as Ni, Pt, Al, Cr or intermetallic particles, e.g., NiAl, NiAl<sub>3</sub>, CrSi, CrB, etc. or combinations thereof, and/or

(d) micropyretric agents including particles, fibers or foils of Ni, Al, Ti, B, Si, Nb, C, Cr<sub>2</sub>O<sub>3</sub>, Zr, Ta, TiO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub>, Fe, Mo or combinations (SDEx 3, c. 4, l. 47 - c. 6, l. 23).

38. "It is also possible for the powder additive to be the same as the reaction product of the micropyretric reaction" (SDEx c. 6, ll. 29-31).

39. Table I in Sekhar '513 describes elemental zirconium and elemental boron reacting to form zirconium diboride (SDEx 3, c. 5, l. 30).

40. Table V in Sekhar '513 describes examples of micropyretric slurries, including slurries containing zirconium, i.e., samples 5 and 12. Sample 5 contains 10 g powder/ 6ml carrier. The carrier is 100 vol % colloidal silica and the powder is 50 wt% SiC, 5 wt% ZrB<sub>2</sub>, 2 wt% Y<sub>2</sub>O<sub>3</sub>, 20 wt% Ti, and 23 wt% Ni. Sample 12 contains 10 g powder/ 5 ml carrier. The carrier is 100 vol % mono-aluminum phosphate and the powder is 90 wt% SiC, 4 wt% Zr, 2.5 wt% Y<sub>2</sub>O<sub>3</sub>, 2.5 wt% Al<sub>2</sub>O<sub>3</sub> and 1 wt% B. (SDEx 3, cc. 9-10, TABLE V, samples 5 and 12).

41. Example V in Sekhar '513 describes a slurry containing 25 g TiB<sub>2</sub>, 10 g Ti and 5 g B in 15 ml colloidal alumina (SDEx 3, c. 10, ll. 50-53).

Morel has already conceded that Morel claims 1, 3, 4, 6 and 9 are anticipated by Sekhar '513 (SDEx 3) (fact 34, p. 14 above). Morel argues that Morel claim 5 is not anticipated by Sekhar '513 because it depends on Morel claim 2 which is not alleged to be anticipated by Sekhar '513 (Paper 20, p. 2).

Initially, we note that the various captions used by Sekhar in Sekhar preliminary motion 1 raise some confusion as to whether or not Sekhar intended to argue that Morel claim 2 is anticipated by Sekhar '513 (SDEx 3).<sup>3</sup> However, Sekhar does not address

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<sup>3</sup> Sekhar preliminary motion 1 alleges that

(i) "Claims 1, 3-6, 9 of the Morel Patent Are Unpatentable Under the Provisions of 35 U.S.C. § 102 Over Sekhar et al., U.S. Patent No. 5,364,513" (Paper 17, TABLE OF CONTENTS).

(ii) "Further, claims 1, 3-5 and 9 of Morel are anticipated under 35 U.S.C. § 102 or, in the alternative, obvious under 35 U.S.C. § 103 over Sekhar et al., U.S. Patent No. 5,364,513 (Sekhar et al. '513)" (Paper 17, p. 1).

(iii) "Specifically, the parties Sekhar et al. request the following precise relief from the Board of



Morel claim 2 in its argued anticipation rejection set forth on pp. 18-21 of Sekhar Preliminary Motion 1 (Paper 17). Moreover, in its argued obviousness rejection over Sekhar '513 (SDEx 3) set forth on p. 23 of Sekhar Preliminary Motion 1 (Paper 17), Sekhar states "Claim 2 of Morel recites a composition comprising zirconium diboride and colloidal silica in a weight ratio of between 1:1 and 9:1. However, such an ingredient weight ratio is easily determined by routine experimentation..." . Therefore, Sekhar apparently did not intend to argue that Morel claim 2 was anticipated by Sekhar '513 (SDEx 3).

Regardless, Morel claim 5, by virtue of its dependence on Morel claim 2, requires a coating composition containing zirconium diboride and colloidal silica in a weight ratio between 1:1 and 9:1. Since we do not find, and Sekhar has not pointed us to, where Sekhar '513 (SDEx 3) describes a coating composition containing zirconium diboride and colloidal silica in a weight ratio between 1:1 and 9:1, Morel claim 5 is not anticipated by Sekhar '513 (SDEx 3).

**B. Are Morel claims 2 and 5 unpatentable for obviousness over Sekhar '513**

**1. Is there a prima facie case of obviousness**

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Patent Appeals and Interferences:

- A. that claims 1-6 and 9 of the Morel Patent be held unpatentable under 35 U.S.C. § 102(e)..." (Paper 17, p. 1).
  - (iv) "C. Claims 1, 3-6, 9 of the Morel Patent Are Unpatentable Under the Provisions of 35 U.S.C. § 102 Over Sekhar et al., U.S. Patent No. 5,364,513" (Paper 17, p. 18).
  - (v) "1. Claims 1, 3-5 of Morel Are Anticipated by Sekhar et al. '513" (Paper 17, p. 18).
  - (vi) "As Sekhar et al. '513 exemplify a coating composition comprising  $ZrB_2$  and a colloidal silica carrier, Sekhar et al. '513 anticipates claims 1, 3-5 of Morel" (Paper 17, p. 20).
- There is no mention of Morel claim 2.

Lack of novelty is the epitome of obviousness. In re Fracalossi, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982). Thus, Morel claims 1, 3, 4, 6 and 9 are unpatentable under 35 U.S.C. § 103 as being obvious over Sekhar '513 (SDEx 3).

According to Sekhar, the zirconium diboride to colloidal silica weight ratio of 1:1 to 9:1 recited in Morel claim 2 "is easily determined by routine experimentation, and it is not inventive to discover the optimum or workable ranges by routine experimentation" (Paper 17, p. 23). Further according to Sekhar, sample 5 of Table V in Sekhar '513 (SDEx 3) "comprises approximately 31.3% SiC, further comprises  $ZrB_2$  and colloidal silica" (Paper 17, p. 24) as required by Morel claim 5.

In its opposition, Morel argues that neither the titanium diboride nor zirconium diboride combinations in Sekhar '513 disclose or suggest a weight ratio of diboride to silica greater than about 1:6 (Paper 20, p. 3). Thus, Morel further argues, it is not required to show the criticality of a range which is not disclosed by Sekhar '513 (Paper 20, p. 4). Sekhar replies that the disclosure in Sekhar '513 "is not limited to any specific relative ratio of zirconium diboride to colloidal silica" (Paper 25, p. 2).

While the examples in Sekhar '513 do not disclose a coating slurry having a weight ratio of a diboride to colloidal silica of 1:1 to 9:1 (see e.g., SDEx, Table V, cc. 9-10), a reference is not limited to the disclosure of its working examples. In re Mills, 470 F.2d 649, 651, 176 USPQ 196, 198 (CCPA 1972). Morel has not pointed us to where Sekhar '513 (SDEx 3) teaches away from use of such a weight ratio. Rather, Sekhar '513 suggests that the coating slurry only requires two components, i.e., a colloidal carrier and at least one powder additive (fact 37, p. 15 above). Moreover, a weight ratio of a diboride to

colloidal silica of 1:1 to 9:1 has not been shown to be inconsistent with the 25 g diboride/ 15 ml colloidal carrier of Example 5 in Sekhar '513 (fact 41, p. 16 above). Therefore, Morel claims 2 and 5 are prima facie obvious over Sekhar '513 (SDEx 3).

**2. If so, has Morel shown unexpected results as to claims 2 and 5**

Morel further argues that the showing of unexpected results provided by the '084 patent with respect to the Sekhar '476 patent (SDEx 2) also applies to the Sekhar '513 patent (Paper 20, p. 5).

Morel relies on the comparison of the oxidation rates of zirconium diboride and titanium diboride in the presence and absence of colloidal silica and on Example 1 in the '084 patent (Paper 20, pp. 5-6).

42. The '084 patent describes (c. 3, ll. 4-15)

[t]he skilled man ... [as]... immediately reject[ing] zirconium diboride since, as shown in Table 1, zirconium diboride oxidises even more easily than titanium diboride in air at a temperature of 1200° C.

| TABLE 1                              |       |        |         |
|--------------------------------------|-------|--------|---------|
| Conversion rate of borides to oxides |       |        |         |
|                                      | 800°C | 1000°C | 1200° C |
| ZrB <sub>2</sub>                     | 35%   | 59%    | 65%     |
| TiB <sub>2</sub>                     | 40%   | 58%    | 61%     |

Table 1 shows that titanium diboride oxidizes more easily than zirconium diboride at 800°C and 1000°C and zirconium diboride oxidizing more easily at 1200°C. It is not enough for Morel to show that the results are different. Morel must show that the differences are unexpected. In re Freeman, 474 F.2d 1318, 1324, 177 USPQ 139, 143 (CCPA 1973) (the burden of showing unexpected results rests on appellants who rely on them); In re D'Ancicco, 439 F.2d 1244, 1248, 169 USPQ 303, 306 (CCPA 1971) (the

differences in results must be significant and of practical advantage). Here, one could as easily draw the conclusion that overall zirconium diboride and titanium diboride oxidize at substantially the same rate.

43. The '084 patent also describes zirconium diboride, when associated with colloidal silica, as oxidizing four times as slowly as titanium diboride (c. 3, ll. 23-25). As described in Table 2 (c. 3, ll. 32-38):

| TABLE 2                        |                           |  |
|--------------------------------|---------------------------|--|
| Percentage conversion to oxide |                           |  |
|                                | Direct rise<br>to 1200° C | Rise with plateau at<br>1000° C for 15 minutes |
| TiB <sub>2</sub>               | 15%                       | 28%  |
| ZrB <sub>2</sub>               | 4%                        | 6%   |

However, both zirconium diboride and titanium diboride oxidize slower when associated with colloidal silica (compare Table 2 with Table 1, facts 43 and 44 above).

Sekhar concedes that "the reduction in the conversion rate of ZrB<sub>2</sub> is somewhat greater than TiB<sub>2</sub>" but argues that when the relative reductions in conversion rates with and without colloidal silica are compared "the differences are less than a factor of 2" (Paper 17, p. 17). According to Sekhar, these differences "are not so great as to be other than the differences one of ordinary skill would expect to find during routine optimization of ingredients (Paper 17, p. 17). Indeed, Sekhar's position is not inconsistent with the prior art. Sekhar '476 (SDEx 2) suggests that both the carrier and the amount of colloidal silica should be optimized and that a number of variables, including differences in coating thicknesses or drying rates, affect the strength of the end product (see e.g., fact 57 below,

p. 27). Sekhar further argues that Table 1 in the '084 patent suggests that relative conversion rates of  $ZrB_2$  and  $TiB_2$  per se are temperature dependent. Sekhar still further argues that Morel has not shown that a similar temperature dependence does not occur in the presence of colloidal silica, i.e., that  $ZrB_2$  associated with colloidal silica oxidizes more slowly than  $TiB_2$  associated with colloidal silica at 800° C or 1000° C. (Paper 17, pp. 17-18). This argument is not inconsistent with the '084 patent.

The Achilles' heel of Morel's position (i.e., "What is surprising here is not that colloidal silica reduces the oxidation rate of both zirconium and titanium diborides ..., but that the zirconium diboride in combination with colloidal silica is so much better than the titanium diborides" (Paper 20, p. 8)) is that a welter of variables affect the test results and Morel has provided essentially a "single-variable" comparison. To wit, the optimal amount of colloidal silica vis-a-vis a given amount of diboride may not be the same for different diborides. Moreover, it is unclear whether other known result-effective variables, such as coating thickness and drying rates, were held constant in the comparisons in the '084 patent. Morel has the burden of explaining its data. Secondly, when patentability is predicated upon some range or other variable, as with Morel claims 2 and 5, the movant must show that such variables are critical by establishing that the claimed values achieve unexpected results. See In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990). Morel has not pointed us to where the '084 patent compares a coating composition containing zirconium diboride and colloidal silica in weight ratios outside the 1:1 and 9:1 required by Morel claims 2 and 5 to a coating composition within the required weight ratio, i.e., to anything indicating the criticality of the claimed range.

Moreover, there is no indication that the Examiner ever questioned the criticality of the 1:1 to 9:1 range (see also, p. 8 above). Finally, to the extent Morel may be relying on the Laurent Declaration (MAEx 1), it is insufficient to establish the criticality of the claimed 1:1 to 9:1 weight range for the reasons set forth above.

Therefore, for the above reasons, Morel has not sustained its burden of showing unexpected results sufficient to overcome the prima facie case of obvious of Morel claims 2 and 5 over Sekhar '513 (SDEx 3).

**3. Are the coatings obtained using the compositions of Morel claims 2 and 5 materially different from the coatings obtained by Sekhar '513**

Morel still further argues that the coatings of Morel and Sekhar '513 are fundamentally different, i.e.,

the coating of Sekhar '513 is formed by sintering (column 2, lines 3-6) and is non-glassy (column 11, line 23). To the contrary, the coating of Morel is a vitreous (glassy) coating (column 2, lines 34-46). [Paper 20, pp. 4-5.]

Sekhar replies that column 6, lines 50-59 and column 7, lines 1-8 of Sekhar '513 describes production of "an impervious silica skin (in an oxidizing atmosphere), i.e., a vitreous/glassy/amorphous phase" (Paper 25, p. 4).

**44. Sekhar '513 describes that**

The coating advantageously contains at least one silicon-containing compound, which may be included as a reactant and/or as a non-reactant, advantageously in a substantial amount, usually accounting for 30 wt % or more of the coating, advantageously 50 wt % or more. Silicon compounds when reacted or sintered form on the body a relatively impervious silica skin, providing excellent resistance against oxidation and corrosion. Formation of such a silicious skin can be enhanced by including colloidal silica in the carrier. [SDEx 3, c. 6, ll. 50-59.]

\* \* \* \* \*

These silicon-based combinations can be used alone or in combination with other silicon or non-silicon non-reactants or with micropyretic reactants, and particularly with colloidal silica in the carrier. When such coatings are sintered before use in an oxidising [sic, oxidizing] atmosphere, or when such coatings are used in an oxidizing atmosphere, the coatings are converted to produce a relatively impervious silica skin. [SDEx 3, c. 7, ll. 1-8.]

Sekhar points to WO 88/03519 (MDEx 1), p. 5, ll. 1-14 to show that “skin” and “glass” are equivalent terms.

45. WO 88/03159 describes

The titanium diboride provides a source in the mixture for boron to be supplied into the silicates to form varying degrees of boro-silicate glasses. The titanium oxidizes to varying degrees to generate nucleation points for crystal growth in the boro-silicate glasses. It is believed that the titanium enters into the silicate mass as part of a crystal structure. Introducing these boron and titanium components into the silicates in this manner evidently causes high temperature glass to form in situ and generate a hermetic skin supported first by the powder silicate mass. The composition of this healing skin or layer alters with temperature and time. The diffusing atmosphere causes this reaction to proceed to thicken the skin and increase its thermal resistance. [MDEx 1, p. 5, ll. 1-14.]

46. Morel also uses an oxidizing atmosphere, see e.g.,

The coating according to the [Morel] invention vitrifies between 600 and 700°C. To obtain efficient protection, vitrification must be rapid. If the coated component must itself be raised to a high temperature very quickly (>300°/h), the coating will be vitrified under good conditions during actual use of the component. If on the other hand the coated component has to undergo a slow rise in temperature, vitrification pretreatment will be necessary, advantageously by using a blowpipe.<sup>[4]</sup> This method of heat-treatment results in a deposit of non-uniform thickness. Glass forms only at

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<sup>4</sup> Hackh's CHEMICAL DICTIONARY, fourth edition, (McGraw-Hill Book Company, New York, published 1969) defines a **blowpipe** as “A metal tube tapering to a fine point, used to blow air into a flame and to direct it as a fine conical tongue in qualitative or mineralogical analysis, soldering, melting in dentistry or jewelry manufacture” at page 103.

the surface, leaving a non-bonded layer between the surface and the substrate. The layer absorbs differences in the coefficient of expansion when the component is subjected to thermal shocks. Typical pretreatment consists in raising the temperature at 300° C./hour up to 1000° C., holding at 1000° C. for 15 minutes and cooling in atmosphere. After cooling, the component is available for its intended use. [The '084 patent, c. 2, ll. 34-52.]

First, Morel claims 2 and 5 recite coating compositions, not methods of coating or coated substrates per se.

Second, insofar as both Sekhar '513 and Morel patent '084 describe methods of coating a material by applying a silicon-based slurry coating composition to the material and heating in an oxidizing atmosphere, it appears that both methods would yield substantially similar coatings under substantially similar reaction conditions. Indeed, "vitrify" means "to sinter or melt to a glassy mass" (see n.2).

Furthermore, Morel's reliance on column 11, line 23 of Sekhar '513 appears to be nothing more than attorney argument, focusing on what is claimed rather than disclosed in Sekhar '513 (SDEx 3).

47. Column 11, line 23 of Sekhar '513 is the following emphasized portion of Sekhar '513 claim 1 (SDEx 3, c. 11):

1. A body of carbonaceous material for use in corrosive environments such as oxidising media or gaseous or liquid corrosive agents at elevated temperatures, coated with a non-glassy protective surface coating which improves the resistance of the body to oxidation or corrosion and which may also enhance the body's electrical conductivity and/or its electrochemical activity, the protective coating being applied from a colloidal slurry containing particulate reactant or non-reactant, **said slurry forming said non-glassy protective coating** by reaction sintering and/or sintering without reaction when the body is heated to a sufficiently elevated temperature.

It is possible for a patent specification to describe more than one patentable



invention, but only claim one patentable invention. Thus, the fact that claim 1 of Sekhar '513 is limited to carbonaceous bodies with non-glassy protective coatings is not dispositive. Attorney argument cannot take the place of evidence lacking in the record. Meitzner v. Mindick, 549 F.2d 775, 782, 193 USPQ 17, 22 (CCPA), cert. denied, 434 U.S. 854 (1977).

To the extent Morel might be relying on the Laurent Declaration (MAEx 1) (see pp. 10-12 above), there is nothing inconsistent between the Laurent Declaration at ¶¶ 4 and 5 (fact 31 above, p. 11) and the disclosure in Sekhar '513 and WO 88/03519 as to formation of boro-silicate "glass" in an oxidizing atmosphere. Furthermore, Dr. Laurent's testimony that "SiC...does not necessarily take part in the vitrification [i.e., glass forming] reaction" (MAEx 1, p. 3, ¶ 6 reproduced in fact 32, p. 10 above) is not inconsistent with the silicon compound taking part in a glass forming, i.e., vitrifying, reaction. Finally, other method parameters, such as thickness of coating, rate of temperature rise, etc. might affect what type of coating is obtained.

For the above reasons, Morel has failed to establish that the coating compositions of Morel claims 2 and 5 produce "materially different" coatings from the coatings described (not claimed) in Sekhar '513.

**C. Are Morel claims 2 and 5 unpatentable for obviousness over Sekhar '476**

48. Sekhar '476 describes a refractory coating

obtained by applying to the surface of a substrate...which needs to be coated and protected, a well chosen micropyrelic slurry which when dried is

ignited to initiate a self-sustaining micropyretric reaction in the dried slurry, along a combustion front, to produce condensed matter forming a coating adherent to the surface of the substrate and protecting it (SDEx 2, c. 5, ll. 31-38).

49. Sekhar '476 defines a "refractory coating or material ... [as] a material, whether carbonaceous, ceramic, or metallic, which can withstand high temperatures" (SDEx 2, c. 5, ll. 12-16).

50. The micropyretric slurry comprises (a) particulate reactants, (b) optional particulate or fibrous fillers, and (c) a carrier (SDEx 2, c. 11, ll. 53-59; c. 13, ll. 19-24).

51. The carrier is usually a colloidal carrier, i.e., colloidal alumina, colloidal silica, colloidal yttria or colloidal monoaluminum phosphate (SDEx 2, c. 11, ll. 60-65).

52. The colloidal carrier "assist[s] in moderating the reaction and considerably improve[s] the properties of the coating" (SDEx 2, c. 11, ll. 60-65).

53. The particulate reactants

comprise components to produce, upon reaction, borides, silicides, nitrides and aluminides, and mixtures thereof, of titanium, zirconium, hafnium, vanadium, silicon, niobium and tantalum, nickel, molybdenum, chromium and iron. Mostly, these reactants will be in the elemental form. ...

Titanium diboride ...[is an example of] the final material, starting from elemental particulate titanium and boron in equimolar proportions in the micropyretric reaction slurry. [SDEx 2, c. 12, ll. 3-19.]

54. "The refractory borides of titanium, zirconium, hafnium, vanadium, niobium and tantalum, or combinations thereof ... are preferred" (SDEx 2, c. 11, ll. 47-50).

55. Optional non-reactant fillers include pre-formed particulates or fibers of the desired refractory material being produced, e.g., pre-formed particulate titanium diboride

(SDEx 2, c. 12, ll. 24-28).

56. Refractory oxycompounds, e.g. alumina or oxides, nitrides, carbides, silicides, aluminides of silicon may also be present in the slurry (SDEx 2, c. 8, ll. 41-44).

57. Example 1 describes micropyretric slurries containing 1 to 2 g of equimolar elemental titanium and boron powder per ml of carriers containing 0-50 v/v % colloidal silica and 100-50 v/v % monoaluminum phosphate. The optimum carrier was around 25-40% colloidal silica and 75-60% monoaluminum phosphate. The silica content could be increased to about 50% by decreasing the coating thickness, by applying multiple layers and by controlling the drying rate and temperature and humidity of the atmosphere. The strength of the end product decreased with lower amounts of silica. (SDEx 2, c. 21, ll. 13-41.)

58. Example 11 describes a micropyretric slurry containing (a) 11.2 g particulate Ti, 4.8 g amorphous particulate boron and (b) 4 g particulate preformed  $TiB_2$  in (c) 5 ml of a carrier which was 14.3 v/v% colloidal alumina, 57.1 v/v% colloidal yttria and 28 v/v % polyurethane (SDEx 2, c. 23, ll. 54-65).

59. Example 13 used the same particulate mixture as Example 11 but the carrier was 5 ml of 25 v/v% colloidal silica and 15 ml of 75 v/v% monoaluminum phosphate (SDEx 2, c. 24, ll. 57-60).

60. Examples 11 and 12 also describe sublayers, i.e., base layers, comprising 25 g  $TiB_2$  in 10 ml of colloidal alumina (SDEx 2, c. 23, ll. 47-51 and c. 24, ll. 19-25).

61. Application in multiple layers is said to improve the pore size, distribution and imperviousness of the end product (SDEx 2, c. 13, l. 48 - c. 14, l. 4).

According to party Sekhar, "Sekhar et al. '476 teach not only coatings in which borides are formed as part of the micropylretic process, but coating compositions which contain pre-formed borides" (Paper 17, p. 10). Further according to party Sekhar, it would have been obvious to replace the preformed titanium boride of Sekhar '476 with preformed zirconium boride and to use colloidal silica as the carrier because Sekhar '476 discloses both titanium boride and zirconium boride as preferred refractory materials and colloidal silica as a suitable carrier, thereby rendering the subject matter of Morel claim 1 obvious (Paper 17, p. 11).

Assuming the specific gravity of colloidal alumina to be 1, party Sekhar asserts that Examples 11 and 12 of Sekhar '476 (SDEx 2) describe a 2.5:1 ratio of  $TiB_2$  to colloidal alumina. Therefore, party Sekhar argues still further that Sekhar '476 (SDEx 2) suggests a  $ZrB_2$  to colloidal silica ratio 2.5:1, thereby rendering the subject matter of Morel claim 2 obvious. [Paper 17, p. 11.]

Finally, party Sekhar argues that the subject matter of Morel claim 5 is obvious in view of Sekhar '476 (SDEx 2) description of coatings containing carbides of silicon (Paper 17, p. 11).

"Having conceded the unpatentability of claims 1, 3, 4, 6 and 9 ..., MOREL argues only the patentability of claims 2 and 5" (Paper 20, p. 9), relying on "the comparative testing in the Morel patent...as sufficient evidence of an unexpected improvement" (Paper 20, p. 10). The insufficiency of the comparative data in the '084 patent to establish unexpected results has been discussed above at pages 18-21.

Morel argues that the Examiner's Statement of Reasons for Allowance of the Morel

patent (the '037 application file, Paper 7, p. 2, ¶ 3) shows that the Examiner viewed “the comparative data [as] showing the superiority of zirconium diboride over titanium diboride” and urges the patentability of claims 2 and 5 for the same reason (Paper 20, pp. 10-11). As discussed above, ex parte decisions of a primary examiner are not binding in inter partes proceedings. Moreover, as pointed out by Sekhar in its reply (Paper 25, pp. 5-6), while the Examiner characterizes Sekhar '476 (SDEx 2) as suggesting a “large group of refractory materials including ZrB<sub>2</sub>” (fact 28 above), Sekhar '476 actually describes a group of only six diborides or combination thereof as being “preferred” (fact 55 above, p. 25). Finally, as discussed at page 9 above, there is no indication that the Examiner ever found it necessary to consider any criticality of the 1:1 to 9:1 weight ratio range of Morel claims 2 and 5.

Thus, for the above reasons, Morel has failed to rebut the prima facie case of obviousness over Sekhar '476.

**D. Are Morel claims 2 and 5 unpatentable for obvious over Sekhar '513 in view of Sekhar '476**

Sekhar has established a prima facie case of obviousness over each of Sekhar '513 and Sekhar '476 individually as to Morel claims 2 and 5 which Morel has failed to rebut by a showing of unexpected results. Therefore, for the reasons set forth on pp. 16-28 above, Morel claims 2 and 5 are unpatentable under 35 U.S.C. § 103 as being obvious over the combination of Sekhar '513 and Sekhar '476.

Therefore, Sekhar preliminary motion 1 is **granted**.

**A.** Morel claims 1, 3-5 and 9 are unpatentable under 35 U.S.C. § 102 as

anticipated by Sekhar '513 (SDEx 3).

**B.** Morel claims 1-6 and 9 are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent 5,364,513 (Sekhar '513) (SDEx 3).

**C.** Morel claims 1-6 and 9 are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent 5,310,476 (Sekhar '476) (SDEx 2).

**D.** Morel claims 1-6 and 9 are unpatentable under 35 U.S.C. § 103 as obvious over Sekhar '513 (SDEx 3) in view of Sekhar '476 (SDEx 2).

**VI. Morel preliminary motion under 37 CFR § 1.633(a)**

Morel seeks judgment pursuant to 37 CFR § 1.633(a) that

**(1)** Sekhar claims 77-82 are unpatentable under 35 U.S.C. § 112, first paragraph (original descriptive support), and

**(2)** Sekhar claims 77-82 are unpatentable under 35 U.S.C. § 103 as obvious over WO 88/03519 (MDEx 1) in view of Lorkin (MDEx 2) (Paper 14).

Sekhar opposes (Paper 21); Morel replies (Paper 24).

**(1) Are Sekhar claims 77-82 unpatentable under § 112, first paragraph**

According to Morel (Paper 14, pp. 1-5), Sekhar claims 77-82 are unpatentable under § 112, first paragraph, because the '115 application does not provide original descriptive support for a coating composition comprising zirconium diboride and colloidal silica.

62. Sekhar claims 77-82 were filed in the '115 application on April 30, 1996 in a preliminary amendment which alleged support for these claims in an attached **APPENDIX**

A (application '115 file, Paper 17).

63. According to **APPENDIX A**, support for a coating composition comprising zirconium diboride and colloidal silica can be found at page 4, lines 26-33; page 7, line 26; page 8, line 21; page 9, lines 10-14; page 10, Table I; page 11, Table III; page 12, lines 15-16; page 13, lines 8-17 and 30; page 17, Table IV; page 18, Table V, sample 5 (the '115 file, Paper 17, p. 7).

64. Table V (the '115 application, p. 18) describes examples of micropyrretic slurries, including slurries containing zirconium, i.e., samples 5 and 12. Slurry sample 5 contains 10 g powder/6 ml carrier. The carrier is 100 vol % colloidal silica and the powder is 50 wt % SiC, 5 wt % ZrB<sub>2</sub>, 2 wt % Y<sub>2</sub>O<sub>3</sub>, 20 wt % Ti, and 23 wt % Ni.

Thus, sample 5 in Table V in the '115 application provides literal support of a coating composition comprising zirconium diboride and colloidal silica as recited in Sekhar claim 77, and further comprising silicon carbide (SiC) as recited in Sekhar claim 78.

Morel argues that, notwithstanding the literal support provided by slurry sample 5 in Table V, attorney remarks on pages 2-4 of "AMENDMENT A" filed September 22, 1995 in parent application 08/320,960 "confirm" that the disclosure in the later filed '115 application "appears to exclude coating compositions and methods which are directed to glassy or vitrified coatings" (Paper 14, p. 3, ¶ 7 to p. 4, first ¶ 8).

65. AMENDMENT A filed September 22, 1995 in application '960 reads

The arguments presented herein were presented in response to the

identical rejection of the product claims in the parent application of the present application, Serial Number 07/898,052 now USP 5,364,513. Perhaps most importantly, the coating of Sara USP 4,559,270 is a glassy coating, whereas the coating of the present application is not. In accordance therewith, all the remaining claims [i.e., claims 48-73] have been amended herein to limit the claims to a method of application to produce a non-glassy material. All of the claims, as originally filed, were and still are restricted to sintered coatings.

\* \* \* \* \*

[S]intering results in materials which are crystalline and sintering does not involve molten materials or the cooling thereof. Glass, on the other hand, is clearly an amorphous material, and during its production, melting of its constituents and later cooling, is required. [The '960 file, Paper 17, pp. 2-3, emphasis in the original.]

66. According to the Examiner's Statement of Reasons for Allowance, parent application '960 was allowed in response to "AMENDMENT A" because "the limitation 'non-glassy coating' in the claims [i.e., claims 48-73] distinguishes over a 'glassy coating' as set forth in the reference (Sara)" (the '960 file, Paper 6, pp. 1-2).

67. Sekhar filed a petition under 37 CFR § 1.313(b)(5) on April 30, 1996 to withdraw the '960 application from issue "in order to permit consideration of an information disclosure statement under 37 CFR § 1.97 in a new application" (the '960 file, Paper 13).

68. Sekhar's Rule 313(b)(5) was granted (the '960 file, Paper 15) and involved application '115 was filed April 30, 1996 as "continuation of application Serial No. 08/320,960, filed October 12, 1994, which is a divisional of application serial number 07/898,052, filed June 12, 1992, now United States Patent 5,364,513" (the '115 file, Paper 16).

69. A preliminary amendment was filed on April 30, 1996 in the '115 application



which

amended original claims 48 and 73 in the parent application 08/320,960, to specify the colloidal components (from claim 64, **minus colloidal silica**). At the same time, **the “non-glassy” limitation has been removed** from claims 48 and 73 and all claims dependent thereupon. Claim 64 has been cancelled.

New claims 74-75 parallel claims 48 and 73 in their original form with the “non-glassy” limitation amended to substantially non-glassy. This distinction, it is felt, more accurately describes the present invention in that **it is inevitable that some glass formation is to be expected in case silicon compounds are present**. However, it is believed that the limitation “substantially non-glassy,” patentably distinguishes the present claims over Sara U.S.P. 4,559,270 and over Weir U.S.P. 4,931,413.

Claim 76 parallels amended claims 48 and 73, except that it is a coating composition claim. Claims 77-82 represent one species of claims 48 and 76 in method and composition format.  
[The ‘115 file, Paper 17, pp. 5-6, emphasis added.]

70. A second preliminary amendment filed April 22, 1997 in the ‘115 application cancelled claims 48-63 and 65-76 “without prejudice to refiling of such claims in one or more continuation applications” (the ‘115 file, Paper 23).

Thus, Sekhar both apparently acknowledged that “it is inevitable that some glass formation is to be expected in case silicon compounds are present” and separately carved out claims to compositions and methods involving use of silicon compounds (see fact 69 above). Furthermore, the ‘115 application describes production of an impervious silica skin (i.e., glassy material) at p. 13, ll. 8-17 [which corresponds to c. 6, ll. 50-59 of Sekhar ‘513] (See the discussion at pp. 22-24 above). Therefore, contrary to Morel’s position

(Paper 14, p. 4, ¶ 8), it is not apparent from either the disclosure of the '115 application or its prosecution history that Sekhar claims 77-82 exclude coating compositions and methods producing glassy or vitrified coatings. ("Where a specification does not require a limitation, that limitation should not be read from the specification into the claims" (emphasis in the original). Specialty Composites v. Cabot Corp., 845 F.2d 981, 987, 6 USPQ2d 1601, 1605 (Fed. Cir. 1988)). Moreover, claims are to be interpreted as broadly as their terms reasonably allow consistent with a specification as it would be interpreted by one of ordinary skill in the art. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). Finally, a broad interpretation is not inconsistent with the definition of "vitrify" as interpreted by one of ordinary skill in the art (see n.2 above, p. 10).

Secondly, Sekhar argues in its opposition (Paper 21, p. 5) that

the granted claims of U.S. Patent 5,364,513 which issued from the parent application of the '115 application, include the word "non-glassy" in addition to words "sinter" or "sintering". Therefore, it is clear that the applicants were excluding from the claims something which they had described in the application, i.e., a predominantly glassy phase coating, and were limiting themselves, in light of the prior art presented, to claims directed to other than predominantly glassy coatings.

We note that none of involved Sekhar claims 77-82 recite "non-glassy", but all of these claims recite a silicon compound.

Morel further relies on Dr. Laurent's interpretation of Sekhar '513 and, by implication, the '115 application to support its construction of Sekhar claims 77-82.

71. Dr. Laurent testified on behalf of party Morel that

I cannot find in the Sekhar [’513] patent a disclosure that a boride and colloidal silica should be provided in a weight ratio approaching or greater than 1:1. I further believe that if such a sample were provided by Sekhar, a glassy phase would be formed upon heating to the temperatures disclosed by Sekhar, so the sample would not function according to the Sekhar disclosure, i.e., coating formation by sintering. Thus a sample with a boride:colloidal silica weight ratio of 1:1 or greater would be non-functional according to the Sekhar disclosure. [MAEx 1, pp. 4-5, ¶ 13.]

First, Sekhar claims 77-82 are not limited to particular ranges of zirconium diboride to colloidal silica weight ratios or heating temperatures. Second, vitrification is a form of sintering (see n.2 above). Third, interpreting vitrification as a form of sintering is not inconsistent with the disclosure of the ‘115 application for the reasons given above. Fourth, expert opinion testimony need not be credited when it does not explain the underlying factual basis for an opinion. Therefore, we decline to accord the Laurent Declaration any weight in determining the proper construction of Sekhar claims 77-82.

Finally, for completeness sake, we note that in its reply Morel argued that “claim 77 of the Sekhar application was interpreted in the manner in which claim 1 of the Morel patent, from which claim 77 was copied, must be interpreted” (Paper 24, p. 2). Under the new interference rules (April 21, 1995), all application claims are to be construed in light of the associated application disclosure, regardless of whether they were copied from a patent, just as they would be during ex parte examination. See 37 CFR 1.633(a) (1995) (“In deciding an issue raised in a motion filed under this paragraph (a), a claim will be construed in light of the specification of the application or patent in which it appears.”);

1995 Final Rule Notice, 60 Fed. Reg. at 14506; 1173 Off. Gaz. Pat. & Tr. Off. at 51.

In summary, we decline to accept Morel's urged construction of Sekhar claims 77-82.

**B. Are Sekhar claims 77-82 unpatentable for obviousness over WO 88/03519 in view of Lorkin**

Weir

72. WO 88/03519 (hereinafter "Weir", MDEx 1) describes precursor "coating" compositions comprising (a) about 15 to 75 wt % titanium diboride, (b) about 10 to 85 wt % of a silica compound, e.g., colloidal silica, and optionally (c) up to about 60 wt %, preferably about 5 to 30 wt % of a metal salt which, when oxidized, can supply ions of silicon, titanium or boron, e.g., silicon carbide, titanium carbide or boron carbide. Upon firing, these precursor compositions form glass ceramic materials suitable for use at high temperatures and in chemically harsh environments as protective coatings, hermetic sealants or simply as articles of manufacture. [MDEx 1, p. 4, ll. 5-20.]

As stated above (fact 45, p. 23), the titanium diboride not only provides a source of boron but also generates nucleation points to form varying degrees of boro-silicate growth.

73. The silicates form the basis for high temperature resistant glass/crystal materials (MDEx 1, p. 5, ll. 28-30).

Lorkin

74. Lorkin describes compositions comprising (a) a matrix having a melting point preferably under 1000° C, which is capable of fusing to a furnace electrode to form a continuous coating of high impermeability in order to reduce attack of the electrode by the

furnace atmosphere, and (b) a refractory filler, which further enhances the impermeability of the coating (MDEx c. 2, ll. 40-51).

75. A 65-85 % matrix / 35-15% filler ratio is used for a service temperature of 700° C; while a 25-50 % matrix / 75-50% filler ratio is used for a service temperature of 1600° C (MDEx 2, c. 2, l. 66 - c. 3, l. 3).

76. Suitable matrices may be (a) graphite wetting materials, e.g. boron containing compounds, e.g., boric oxide and boric acid, (b) combinations of glaze-forming materials, e.g., phosphates (such as alkali metal phosphates), fluorides (such as calcium fluoride, sodium aluminum fluoride and sodium borofluoride) and silicates (such as alkali metal silicates), or (c) combinations of (a) and (b) (MDEx 2, c. 3, ll. 24-38).

77 . Suitable fillers may be refractory oxides, carbides, nitrides or borides, e.g., “chromic oxide, zirconium oxide, titanium oxide, silicon carbide, zirconium carbide, wolfram carbide, boron nitride, titanium boride, zirconium boride, silicon nitride” (MDEx 2, c. 3, ll. 39-43).

78. Protecting coating compositions comprising boron compounds with refractory carbide fillers are preferred (MDEx 2, c. 3, ll. 48-50). A dry powder coating composition of 50% B<sub>2</sub>O<sub>3</sub> (boron oxide) and 50% silicon carbide is exemplified (MDEx 2, c. 3, ll. 64-65).

#### Morel's statement of obviousness

Morel acknowledges that Weir differs from Sekhar claims 77-82 in not disclosing the presence of zirconium diboride in the coating composition (Paper 14, p. 6, ¶ 14). Morel maintains that it would have been obvious to one of ordinary skill in the art “to replace all or part of the titanium diboride of ... with zirconium diboride” in view of Lorkin's

disclosure that titanium boride and zirconium boride are suitable [fillers] in combination with a silicate in a protective coating composition and because zirconium diboride is a metal salt which would function as an alternate source of boron (Paper 14, p. 7, ¶¶ 15 and 16).

However, as argued by Sekhar in its opposition (Paper 21, p. 6), Weir requires titanium diboride, not only as a source of boron but also as a generator of nucleation points for boro-silicate (i.e., glass) growth (fact 65 above, p. 32 and fact 45 above, p. 23). Moreover, as further argued by Sekhar (Paper 21, p. 6), the metal salt in Weir is clearly an optional component (fact 65 above, p. 32). Morel has not explained what would have motivated one of ordinary skill in the art to replace a required component with an optional component in the coating composition of Weir. Moreover, Morel has not pointed us to where the record discloses or suggests that zirconium diboride is capable of functioning as a generator of nucleation points for boro-silicate growth.

In its reply (Paper 24, pp. 7-8), Morel raises new points of argument, namely that it would have been obvious to combine a glaze-forming silicate matrix with a zirconium diboride filler as disclosed by Lorkin since both Weir and Lorkin disclose combinations of titanium diboride and colloidal silica as protective coatings and Lorkin discloses both titanium boride and zirconium boride as suitable fillers. First, this reply does not appear to be responsive to any argument raised by Sekhar in its opposition. Raising new points of argument in a reply is procedurally unfair to an opponent who has no opportunity to respond thereto. Therefore, Morel is cautioned that replies raising new points of argument will not be considered. Second, even assuming arguendo, that Morel's reply was proper,

Morel has not pointed us to where the record equates colloidal silica (Weir) with alkali metal silicates (Lorkin) in a coating composition or why the skilled artisan would have combined colloidal silica and zirconium diboride as the specific matrix and filler combination of Lorkin. Morel has not pointed us to where Lorkin discloses or suggests colloidal matrices. Assuming arguendo that it would have been prima facie obvious to select a boride filler from Lorkin's list of refractory oxides, carbides, nitrides and borides, Morel has not explained why the skilled artisan would have further selected zirconium boride as that boride. If anything, Weir would have suggested selecting titanium boride as the boride.

For the above reasons, Morel has failed to establish that Sekhar claims 77-82 are unpatentable under § 103 as obvious over Weir in view of Lorkin.

Therefore, Morel motion under 37 CFR § 1.633(a) is **denied**.

## **VII. Order**

All of Morel's claims involved in the interference, i.e., Morel claims 1-6 and 9, are unpatentable to Morel and none of Sekhar's claims involved in the interference, i.e., Sekhar claims 77-82, have been shown to be unpatentable to Sekhar. Normally we would proceed to the priority phase of the interference where each party submits evidence to prove dates of invention. However, Morel does not intend to present priority evidence; rather it intends to rely solely on the January 28, 1993 filing date of its earlier French Application No. 93 01258 to prove constructive reduction to practice of the inventions of Counts 1 and 2 (Paper 15). Similarly, Sekhar intends to rely solely on the June 11, 1992

filing date of its earlier patent application (07/898,052) (Paper 16). Sekhar has an earlier date of constructive reduction to practice of the inventions of Counts 1 and 2 than Morel. Thus, Sekhar is also entitled to prevail on the issue of priority; hence it is appropriate to enter a final decision.<sup>5</sup>

Therefore, upon consideration of the record, and for the reasons given, it is:

**ORDERED** that Morel preliminary motion under 37 CFR § 1.633(f) is **granted**.

**FURTHER ORDERED** that Morel is entitled to benefit for the purpose of priority of Morel French Application No. 93 01258 (MDEx 3).

**FURTHER ORDERED** that Morel preliminary motion under 37 CFR § 1.633(4)(c) is **denied**.

**FURTHER ORDERED** that Sekhar preliminary motion 1 is **granted**.

**FURTHER ORDERED** that Morel claims 1, 3-5 and 9 are anticipated and, therefore, unpatentable. 35 U.S.C. § 102.

**FURTHER ORDERED** that the subject matter of Morel claims 1-6 and 9 would have been obvious and, therefore, Morel claims 1-6 and 9 are unpatentable. 35 U.S.C. § 103.

**FURTHER ORDERED** that Morel preliminary motion under 37 CFR § 1.633(a) is **denied**.

**FURTHER ORDERED** that judgment on priority as to Counts 1 and 2 (Paper 1, Appendix 3) is awarded against junior party BERTRAND MOREL.

**FURTHER ORDERED** that Junior party BERTRAND MOREL is not entitled to a

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<sup>5</sup> Attention is directed to 35 U.S.C. § 135(c) and 37 CFR § 1.661.



patent containing claims 1-5 (corresponding to Count 1) and 6 and 9 (corresponding to Count 2) of Morel U.S. Patent 5,420,084. 35 U.S.C. §§ 102 and 103.

**FURTHER ORDERED** that a copy of this final decision shall be placed and given a paper number in the file of Morel, U.S. Patent 5,420,084 and Sekhar, U.S. Application 08/640,115.

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FRED E. McKELVEY, Senior )  
Administrative Patent Judge )  
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| SALLY C. MEDLEY             | ) |                 |
| Administrative Patent Judge | ) |                 |

Enc: Copy of Hackh's CHEMICAL DICTIONARY, fourth ed., (McGraw-Hill Publishers 1969), pp. 103, 298, 614 and 717.

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